NOAA Teacher at Sea
Karolyn Braun
Onboard NOAA Ship KA'IMIMOANA
October 6 – 28, 2006

NOAA Teacher at Sea: **Karolyn Braun**
NOAA Ship KA'IMIMOANA
Mission: TAO Buoy Array Maintenance
Sunday October 15, 2006

Plan of the Day
0600 CTD cast 3S/155W
1100 TAO Buoy
CTD cast 4S/155W
AOML Adopt-a-Drifter Buoy
1800 CTD cast 5S/155W
2300 CTD cast 6S/155W

Well today I woke up at 5 a.m. to watch the sunrise as we sailed passed Malden Island. It was only two miles away…Beautiful. We were so close I could see the waves breaking on its sandy beaches. From doing some research, and thanks to the Chief Scientist, I found that Malden was formerly known as Independence Island. It is a low, arid, uninhabited island in the central Pacific Ocean, about 39 km² in area. It is one of the Line Islands belonging to Republic of Kiribati. The island is chiefly notable for its "mysterious" prehistoric ruins (of Polynesian origin), its once-extensive deposits of phosphatic guano (exploited by Australian interests from c. 1860-1927), its use as the site of the first British H-bomb tests (Operation Grapple, 1957), and its importance as a protected area for breeding seabirds.

At the time of its discovery, Malden was found to be unoccupied, but the remains of ruined temples and other structures indicated that the island had at one time been inhabited. At various times these remains have been speculatively attributed to "wrecked seamen", "the buccaneers", "the South American Incas", "early Chinese navigators", etc. In 1924 the Malden ruins were examined by an archaeologist from the Bishop Museum in Honolulu, K.P. Emory, who concluded that they were the creation of a small Polynesian population, which had resided there for perhaps several generations some centuries earlier.

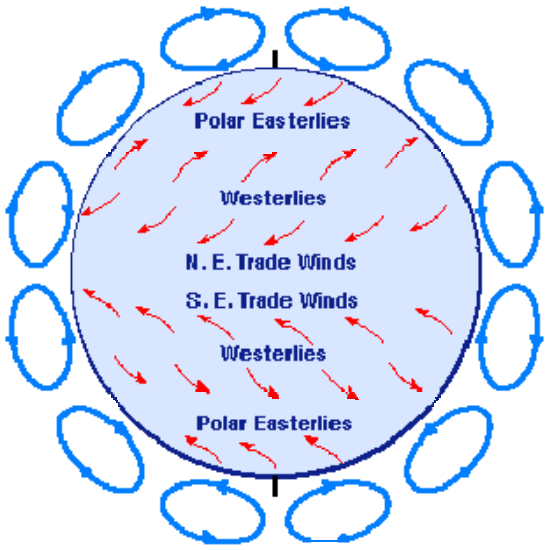
Malden was reserved as a wildlife sanctuary and closed area, officially designated the

Malden Island Wildlife Sanctuary, on 29 May 1975, under the 1975 Wildlife Conservation Ordinance. The principal purpose of this reservation was to protect the large breeding populations of seabirds. The Wildlife Conservation Unit of the Ministry of Line and Phoenix Islands Development, headquartered on Kiritimati, administers the sanctuary. There is no resident staff at Malden, and the occasional visits by foreign yachtsmen and fishermen cannot be monitored from Kiritimati. A fire in 1977, possibly caused by visitors, threatened breeding seabirds, and this remains a potential threat, particularly during periods of drought. There were 4 small buildings and some telephone poles visible but all looked very desolate.

The ship stopped, we conducted a CTD and were off for our next TAO buoy about five hours away. The winds picked up, so consequently the seas have picked up as well, so we are not traveling as fast—only about 10 knots. We are leaving the doldrums and entering the trade winds. Let me explain some.

The Earth is a spinning globe where a point at the equator is traveling at around 1100 km/hour, but a point at the poles is not moved by the rotation. This fact means that projectiles moving across the Earth's surface are subject to Coriolis forces that cause apparent deflection of the motion.

Since winds are just molecules of air, they are also subject to Coriolis forces. Winds are basically driven by Solar heating. Solar heating on the Earth has the effect of producing three major convection zones in each hemisphere.



If solar heating were the only thing influencing the weather, we would then expect the prevailing winds along the Earth's surface to be either from the North or the South, depending on the latitude. However, the Coriolis force deflects these wind flows to the right in the Northern hemisphere and to the left in the Southern hemisphere. This produces the prevailing surface winds (See figure).

For example, between 30 degrees and 60 degrees North latitude, the solar convection pattern would produce a prevailing surface wind is from the South. However, the Coriolis force deflects this flow to the right and the prevailing winds at these latitudes are more from the West and Southwest. They are called the prevailing Westerlies.

The doldrums occur at the equator as the winds from the N.E. trade winds and the S.E. trade winds cancel each other out and everything becomes calm.

Ok enough of the science for now.

After we did a TAO visit, a CTD was conducted and I threw in my second Adopt-a-Drifter Buoy. I ended up taking a nap after all was said and done. With the swell getting bigger, so was my upset stomach. I woke up in time for dinner but didn't eat much. I did some schoolwork and was off to bed. I am hoping tomorrow is better.